# Prevalence and Associated Factors of Smartphone Addiction Among Medical and Health Sciences University Students: A Cross-Sectional Study

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## ABSTRACT

In recent years, dependence on smartphones is seen to be the rise. Despite its numerous communicative affordances, past research suggests potential adverse effects when smartphones are overused. The primary objective of this study was to estimate the prevalence of Smart Phone Addiction (SPA) as it connects to smartphone usage and associated factors among An-Najah medical and health sciences students in Palestine. A cross-sectional design and convenient sampling technique were used to select eligible students from different programs in the faculty of Medicine and Health Sciences at the An-Najah National University. Three hundred sixty-seven students were recruited. The Smartphone Addiction Scale-Short Version (SAS-SV) was used to explore the prevalence of SPA. The SPA prevalence was found to be 37.9% among medical and health sciences university students. In comparison to those in their fourth year or higher, prevalence among first-year students was highest (OR=0.17, p-value=0.022), representing a significant statistical difference. The daily duration of smartphone use in hours when compared with more than 4 hours and 2-4 hours revealed significant statistical differences with (OR=2.90, p-value=0.003). Other factors (age, gender, university program, cigarette smoking, study year, history of chronic diseases) had no statistical differences when compared with the prevalence of SPA. The Prevalence of SPA was high when compared with other studies 37.9% among medical and health sciences university students globally. This high SPA was associated with first-year students and their use of smartphones (SP) for more than 4 hours. This study may shed some light on the prevalence of SPA and its relationship with socio-demographic and lifestyle factors in regions across Palestine.

**Keywords**: Smartphone; Addiction; University students; Prevalence; Associated factors.

## INTRODUCTION

Global societies have seen significant change as a result of the emergence of smartphones. This rise has also changed how people of all ages communicate. One of the leading instruments for "communication, education, and amusement" is the smartphone [1]. Particularly among young people, smartphones are now an essential component of daily life. Society's growing dependence on them has given rise to a new issue called smartphone addiction. In general, SPA is defined as the unchecked, excessive, and problematic usage of smartphones, notwithstanding the detrimental effects on one's social and personal life [2,3].

Modern culture has become profoundly influenced by recent technological advancements, and smartphone technology permeates every aspect of daily life. Smartphone technology, however, is a prime illustration of the "paradox of technology," since it both serves to enslave and help us [4]. Smartphones are a double-edged sword, which can help maintain contact with family and friends while also allowing to form new ties with strangers. Furthermore, smartphones provide the most efficient forms of amusement (for example, mobile games, online videos, information searching, novel reading, and online purchasing) [2].

SPA is part of a larger behavioral addiction group. Behavioral addiction is a relatively new concept in American psychiatry, having been recognized by the Diagnostic and Statistical Manual of Mental Disorders for the first time in 2010 [5]. Additionally, SPA affects anywhere from 9.3 percent to 48 percent of the world's population [6, 7, 8].

Social pressures for constant connectivity may be one source of SPA [9]. Individuals are drawn to using their phones in order to prevent missing out socially. People overuse their smartphones out of a fear of missing out, as they want to be available to absent friends and keep up with what's going on in their friend's life [10]. These pressures encourage people to talk on their phones even when they are with people they want to talk to.

Excessive smartphone use is described as a pattern of functional impairment in everyday tasks and substance dependence-like symptoms [11]. People who use them excessively are said to develop a new mental health condition known as smartphone addiction [12].

There have been numerous suggestions to explain the various pathways leading to smartphone addiction including: impulsivity, self-esteem, neuroticism, and confused thinking [13,14,15]. A rising number of studies have linked SPA to increased stress levels [16], anxiety and depression disorders [10, 17], poor social relationships [18], sleep disruption [19, 20], low physical activity, fast food consumption, as well as weight gain [21, 22].

Research shows teens and college students use smartphones most frequently, putting them at a higher risk of SPA than the overall population [10, 16]. One study among Chinese college students found a smartphone addiction rate of more than 35% [23]. A prior systematic review study found that medical students were at higher odds of having internet addiction five times over the general population [24]. Another study showed that students with bachelor degrees in the Kingdom Saudi Arabia (KSA) had the highest degree of SPA [6].

The prevalence of SPA among college students in some Arab countries ranges between 8.6% in Yemen to 72% in KSA [25, 26, 27]. Established research has found that SPA among college students was linked to greater stress, anxiety, and depression levels [28, 27], insufficient sleep duration [27, 21] and negative health-related behaviors, such as consuming more fast food, exercising less, and gaining weight [21]. This emphasizes the need for further research into the risk factors for SPA

as well as the mechanisms underlying the possible links between SPA, negative health outcomes, and lower academic achievement among college students [29].

The aim of this study was to estimate the prevalence and associated factors of SPA among An-Najah medical and health sciences students in Palestine. The null hypothesis of the study is that there is no significant prevalence of SPA among the medical and health sciences university students enrolled at the An-Najah medical and health Sciences College, and that there are no associated factors related to SPA at the level of 0.05.

## METHODS

### Study design and setting

The study design was cross-sectional, using a self-administered questionnaire to address the aim of the study. A total of 367 university students were recruited from different programs of the college of Medicine and Health Sciences. A convenient sampling technique was used to choose the sample. The sample size was calculated using the Raosoft program with a confidence level of 95%, margin of error at 5%, and a response rate of 50%.

All undergraduate students registered in the college of Medicine and Health sciences study medicine and health sciences, which include: nursing, audiology and speech therapy, pharmacy, radiology, and optics. Students who were enrolled at the An-Najah University during spring courses of the 2020-2021 academic year and agreed to participate were eligible and included in the study. The study excluded students from other universities or colleges as those students attended classes at their university only partially during the last period of the COVID-19 pandemic.

Filling the questionnaire took about 15-20 minutes. The students answered the questionnaire in a safe and convenient space in their classrooms.

### Instruments

A self-administered questionnaire was used to gather the study information. The first section of the questionnaire collected socio-demographic and behavioral data, including age (years), gender, college, academic program, year of study, smoking status, physical

activity in the previous week, history of doctor-diagnosed chronic diseases, and daily duration of smartphone use in the previous week.

The second section assessed SPA using abbreviated versions of the Arabic and English Smartphone Addiction Scale (SAS-SV). Each of the 10 items in the SAS-SV represents a score between 1 (strongly disagree) and 6 (strongly agree) on a Likert scale. The total of these factors yields an SAS-SV score, with a higher score signifying SPA (range: 10–60). The scale was validated in both languages and the internal consistency and concurrent validity of SAS-SV were verified (Cronbach's alpha=0.967) to explore the prevalence of SPA [30, 31]. Calculated totals were compared to cut-off points of 33 for women and 31 for men. Students were deemed to be addicted if their scores exceeded the cut-off point [30].

### Data Analysis

The data was analyzed using the Statistical Package for Social Sciences (SPSS v 23). Descriptive statistics (frequencies, percentages, means, standard deviations) were calculated for all variables. Binary logistic regression analyses estimated associations of dichotomous SPA (yes, no) with the independent associated factors (age, gender, university program, study year, cigarette smoking, physical exercise, history of chronic diseases, and daily duration of smartphone use in hours). Reference categories were female or male for gender; age was used as a continues variable; optics for university program; fourth or higher for the study year; no response for cigarette smoking; no response for history of chronic diseases; and above 4 hours for daily duration of smartphone use in hours.

### Ethical approval and consent to participate

The invitation letter and consent forms written in Arabic were included in the questionnaire's introductory section. Students who agreed to participate completed the questionnaire. The study was authorized by the An-Najah Institutional Review Board (Ref. no. 1.201), according to the standards of the American Psychological Association (APA. 2010), and with the 2013 Helsinki Declaration. Informed consent was obtained from all participants.

## RESULTS

The questionnaire was filled out by 367 of the 410 total participants, yielding a response rate of 89.5%. The mean age of the students was 20.4. The percentage of male respondents was 17.2% (n=63), and for females was 82.8% (n=304). The students were recruited from the programs of Medicine 24% (n=88), Nursing 22.6% (n=83), Audiology and Speech Therapy 22.1% (n=81), Pharmacy 6.3% (n=23), Radiology 11.2% (n=41), and Optics 13.9% (n=51).

According to the study year of the participants; second-year students formulated the highest percentage 38.7% (n=142). About 88.3% (n=324) did not smoke cigarettes.

A large majority of students 59.4% (n=218) never engaged in physical exercises during the week, while the rest engaged in physical exercises between 1-7 times per week. The majority of students 94.6% (n=347) had no history of chronic disease. A significant number of students used their smartphones more than 4 hours 84.2% (n=309).

The Prevalence of SPA among these medical and health sciences college students was determined to be 37.9% (n=139). The SPA prevalence for females was 35.9% (n=109); compared with 47.6% (n=30) among males.

Regarding the university program, medical students had the highest SPA prevalence at 38.6% (n=34). First-year students had the highest SPA prevalence when compared with other study years 50.0% (n=22). About 51.2% (n=22) of those who smoke cigarettes had SPA. When students were asked about the days they used physical exercise for at least 10 minutes, 40.4% (n=88) of those who did not exercise had SPA. In addition, students who used their SP for more than 4 hours had the highest prevalence of SPA 41.4% (n=128) Table 1.

**Table (1):** Socio-demographic and health characteristics of the study participants.

| Variables | | | No (%) | SPA according to SAS | |
|---|---|---|---|---|---|
| | | | | Yes (%) | No (%) |
| Age | Mean | SD | | | |
| | 20.4 | 9.1 | | | |
| Gender | Male | | 63 (17.2) | 30(47.6) | 33(52.4) |
| | Female | | 304 (82.8) | 109(35.9) | 195(64.1) |
| | **Total** | | **367(100%)** | | |
| University program | Medicine | | 88 (24.0) | 34(38.6) | 54(61.4) |
| | Nursing | | 83 (22.6) | 31(37.3) | 52(62.7) |
| | Pharmacy | | 23 (6.3) | 10(43.5) | 13(56.5) |
| | Audiology and speech therapy | | 81 (22.1) | 26(32.1) | 55(67.9) |
| | Radiology | | 41 (11.2) | 16(39.0) | 25(61.0) |
| | Optics | | 51 (13.9) | 22(43.1) | 29(56.9) |
| Study year | First | | 44 (12.0) | 22(50.0) | 22(50.0) |
| | Second | | 142(38.7) | 54(38.0) | 88(62.0) |
| | Third | | 84 (22.9) | 32(38.1) | 52(61.9) |
| | Fourth or more | | 97 (26.4) | 31(32.0) | 66(68.0) |
| Cigarettes Smoking | Yes | | 43 (11.7) | 22(51.2) | 21(48.8) |
| | No | | 324(88.3) | 117(36.1) | 207(63.9) |
| How many days in the past week did you perform at least 10 min. | Never | | 218(59.4) | 88(40.4) | 130(59.6) |
| | 1-4 | | 122(33.2) | 44(36.1) | 78(63.9) |
| | 5-7 | | 27 (7.4) | 7(25.9) | 20(74.1) |
| History of chronic diseases | Yes | | 20 (5.4) | 8(40.0) | 12(60.0) |
| | No | | 347(94.6) | 131(37.8) | 216(62.2) |
| Daily duration of smartphone use in hours | 2-4h | | 58 (15.8) | 11(19.0) | 47(81.0) |
| | >4h | | 309(84.2) | 128(41.4) | 181(58.6) |

SAS: Smartphone Addiction Scale.

### *Factors associated with SPA prevalence*

As shown in Table 2, the logistic regression analysis about the associated factors of SPA revealed that, compared with fourth year students or higher, first-year students had higher values (OR=0.17, p-value=0.022), which represented a significant statistical difference. The daily duration of smartphone use in hours when comparing more than 4 hours with 2-4 hours revealed significant statistical differences (OR=2.90, p-value=0.003). Other risk factors had no statistical differences when compared with the prevalence of SPA Table 2.

**Table (2):** Factors associated with SPA among University students.

| Variables | | B | SE | OR | (95% C. I for OR) | | P |
|---|---|---|---|---|---|---|---|
| | | | | | Lower | Upper | |
| Gender | Male | -0.358 | 0.335 | 0.61 | 0.36 | 1.35 | 0.285 |
| | Female | 0a | | | | | |
| Age (scale) | | -018 | 0.026 | 0.98 | 0.93 | 1.03 | 0.478 |
| University program | Medicine | 0.170 | 0.389 | 1.19 | 0.55 | 2.54 | 0.662 |
| | Nursing | 0.363 | 0.414 | 1.44 | 0.64 | 3.24 | 0.380 |
| | Pharmacy | 0.004 | 0.561 | 1.00 | 0.34 | 3.34 | 0.994 |
| | Audiology and speech therapy | 0.656 | 0.392 | 1.93 | 0.90 | 4.15 | 0.094 |
| | Radiology | 0.315 | 0.472 | 1.37 | 0.54 | 3.45 | 0.505 |
| | Optics | 0a | | | | | |
| Study year | First | 0.756 | 0.372 | 2.13 | 1.03 | 4.41 | 0.042 |
| | Second | 0.267 | 0.278 | 1.34 | 0.76 | 2.25 | 0.336 |
| | Third | 0.270 | 0.313 | 1.31 | 0.71 | 2.42 | 0.388 |
| | Fourth or more | 0a | | | | | |
| Cigarette Smoking | Yes | -.612 | 0.376 | 0.54 | 0.26 | 1.13 | 0.103 |
| | No | 0a | | | | | |
| History of chronic diseases | Yes | 0.003 | 0.497 | 1.01 | 0.38 | 2.64 | 0.995 |
| | No | 0a | | | | | |
| Daily duration of smartphone use in hours | 2-4h (0a) | -0.346 | 0.115 | 2.90 | 0.707 | 0.564 | 0.003 |

0a: reference category. OR: Odds ratio. SE: standard error. CI: confident interval. Daily duration of SP 2-4hours is a reference category for morethan4 hours.

## DISCUSSION

The present study investigated the prevalence of SPA among students enrolled in the An-Najah medical and health sciences program. The Prevalence of SPA among these students was determined to be 37.9% (n=139). These results are consistent in -finding significant prevalence of SPA- with previous studies.

University students are in their adolescence stage of development and this may factor in the significant prevalence of SPA. A study done in Saudi Arabia among university students found that SPA was seen in 71.9% (n=136) of the 189 students [21]. Another study found that among 1.63 million Korean adolescents, 17.9% were addicted to smartphones [32]. Furthermore, a study of Chinese teens found that SPA was negatively connected with student relationships [33].

Previous research has revealed that female middle school and university students and those younger in age have more severe SPA [34, 35, 36, 37, 38]. One Spanish study reported the prevalence of 20 (26.1 in females, 13 in males) [39]. Also, numerous studies confirmed that females have a higher prevalence and problematic use of SPA over males [40, 41, 42].

However, this study did not substantiate these findings as there were no statistical differences between males and females when compared to SPA. Instead, the current study found that first-year university students are more prone to SPA when compared with other study years (OR=0.17, p-value=0.022). This study's results were consistent with the established research; in India and globally, mobile phone use has grown higher among particular groups, especially adolescents and youth [43, 44, 45].

The current study revealed a significant prevalence of SPA among university students in addition to certain independent variables evoking positive association with SPA. It was found that increasing the use of smartphones per hour increased the likelihood of SPA (OR=2.90, p-value=0.003), which was consistent with previous research [46, 47]. Based on these findings, it may reasonable to predict that as the rate of smartphone usage rises, so does the risk of addiction [48, 47, 30]. This study's results found no significant association between cigarette-smoking and SPA, which was found to be contrary to other previous studies that found the majority of those with smartphone addiction were non-smokers [32].

There are several limitations to the current study. First, participants were only recruited from the college of Medicine and Health Sciences, where the sample of females was higher than that of males, which may reduce the generalizability of the present results to other at-risk age groups and gender-based studies. Second, the current study did not include many potential risk factors such as; anxiety, depression, obesity, and other psychological effects of smartphone use. Also, the self-report estimates of phone use limited the source of data as only from the participant's reports.

## CONCLUSION

The study revealed a prevalence of SPA (37.9%) among university students. SPA was most common among first-year students who used their SP for more than 4 hours. Other risk factors had no statistical differences when compared with the prevalence of SPA. This study may shed some light on the prevalence of SPA and its relationship with socio-demographic and lifestyle factors in the Palestinian regions. This information is vital for developing hypotheses about the likely impact of SPA and guide future research opportunities for finding techniques to preventing SPA among university students and the total world-wide populations.

## ACKNOWLEDGMENTS

### *Data availability statement*

Data used for this study will be made available upon request.

### *Ethics Statement*

The invitation letter and consent forms written in Arabic were included in the questionnaire's introductory section. Students who accepted the invitation to participate completed the questionnaire. The study was authorized by the An-Najah Institutional Review Board (Ref. no. 1.201), according to the standards of the American Psychological Association (APA. 2010), and with the 2013 Helsinki Declaration. Informed consent was obtained from all participants.

## Additional information

## Author Contribution

**Adnan Lutfi Sarhan:** Conceptualization, Data collection, Writing- Original draft preparation, Methodology, Software analysis, Supervision, writing- Reviewing and Editing.

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